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| EXAMINER | |
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| MARTEN, JERROD B | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/550,702 | SEYFRIED, LUC | |
| | Examiner | Art Unit | |
| | JERROD B. MARTEN | 1797 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *04/23/2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *18-24 and 26-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-24 and 26-52* is/are rejected.

7)☒ Claim(s) *27-33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/23/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

Examiner acknowledges the amendment filed 04/23/2009 containing an amendment to the claims and remarks. Examiner acknowledges claims 18-24 and 26-49 as amended and new claims 50-52.

### *Response to Arguments*

1. Applicant's arguments, see Remarks, page 8, paragraph 1, filed 04/23/2009, with respect to the rejection(s) of claim(s) 1 under 35 U.S.C. 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Schoppe et al. (US 6,451,075), Henderson (US 3,224,848), and Marschner (US 2,407,717).

### *Information Disclosure Statement*

2. The information disclosure statement filed 04/23/2009 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

3. A copy of FR 2830259 was not supplied.

***Claim Objections***

4. Claim 27-29 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 27-29 fail to further limit parent claim 18 as claim 18 recites that the hydrocarbon cut (B1) is generally constituted by isooctanes in an amount greater than 70% by mass, and claim 27 requires that B1 is essentially constituted by isooctanes and claims 28 and 29 require that the isooctane content be greater than 40% and 43%, respectively, all of which are previously required in claim 18.

5. Claims 30-33 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 30-33 fail to limit their parent claims as the claims require that the isoparaffinic hydrocarbons containing eight carbon atoms are isooctances which is already implicitly and explicitly required in independent claim 18, as claim 18 requires that base B1 is comprised of 70% isooctanes which are all considered to have 8 carbon atoms.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 18-24 and 26-52 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation of "and, optionally, by other hydrocarbons and additives customary for this type of fuel, in a quantity and quality sufficient for the fuel to comply with the specification in force," currently renders claim 18 indefinite. It is unclear what subject matter is encompassed within the scope of the recitation. Further, it is unclear whether or not the recitation is truly optional or constitutes essential subject matter.

9. Further, the term "substantial quantities" in claim 1 is a relative term which renders the claim indefinite. The term "substantial quantities" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear to what degree the term "substantial quantities" limits the claim and whether it necessarily limits the claim at all; the comparative example provided in the specification shows that within the limits of the invention the quantities of base B1 and B2 may vary over a wide range generally from approximately 45% to 90%, for B1, and from approximately 9% to 20%, for B2, which could be construed as a definition or limitation of the "substantial quantities" but it is unclear whether a "substantial" quantity for each base would begin at 9% or whether a

"substantial" quantity for each base would be limited to the range shown in the comparative example. The general ambiguity of the term generally calls into question the scope of the subject matter which applicant regards as the invention.

10. Claims 30-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 30-32 are generally rendered indefinite by the recitation "wherein the isoparaffins containing eight carbons atoms are isooctanes" and claim 33 is generally rendered indefinite by the recitation " wherein the level of isooctanes in the isoparaffinic hydrocarbons cut (B1) with eight carbon atoms is greater than 70% by mass". It is generally unclear what is meant by these recitations as all isoparaffins with eight carbon atoms are isooctanes by definition.

11. Claims 38-40 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 38-40 are rendered indefinite respectively by the recitations " wherein the isoparaffinic hydrocarbons containing five carbon atoms are isopentanes.", "wherein the level of isopentanes in the isoparaffinic hydrocarbons cut (B2) with five carbon atoms is greater than 85% by mass.", "wherein the level of isopentanes in the isoparaffinic hydrocarbons cut (B2) with five carbon atoms is greater than 90% by mass." It is generally unclear what is meant by these recitations as all isoparaffins with five carbon atoms are isopentanes by definition.

12. Claims 47-49 provide for the use of the fuel recited in claim 18 in spark ignition engines of aircraft, spark ignition engines of competition or similar vehicles, a fuel

treatment unit coupled to a fuel cell unit, but, since the claims do not set forth any steps involved in the methods/processes, it is unclear what methods/processes applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 47-49 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**16. Claims 18-24, 26-40, 43-44, 47-48, and 50-51 rejected under 35 U.S.C. 103(a) as being unpatentable over Schoppe et al. (US 6,451,075) in view of Henderson (US 3,224,848).**

17. In regard to claim 18, Schoppe et al. discloses a fuel for feeding spark ignition engines fitted in aircraft (Abstract):

- having an F4 octane number at least equal to 130 **(see col. 1, Table 1, line 37, where the supercharge rating is the F4 octane number)**
- said fuel containing substantial quantities of a first hydrocarbons base (B1) essentially constituted by isoparaffins comprising 6 to 9 carbon atoms wherein a level of isooctanes in the isoparaffinic cut (B1) is greater than 70% by mass **(see col. 7, Example 2, line 3, where 60.0% of the composition is isooctane and 100% of the base B1 is isooctane)**

- a second hydrocarbons base (B2) also constituted by isoparaffins comprising 4 or 5 carbon atoms **(see col. 7, Example 2, lines 7-8, 8.0% isopentane, and 3.0% isobutane)**

18. Schoppe et al. does not explicitly disclose the fuel for feeding spark ignition engines fitted in aircraft wherein the composition contains a third base oil (B3) composed of cycloparaffins, comprising 6 to 8 carbon atoms, in a quantity of at least 5%. Further, Schoppe et al. does not explicitly teach that the ratio of the quantities by volume (B1+B2)/B3 is greater than 2.0.

19. Henderson et al. disclose blended gasoline compositions for spark ignition engines **(see col. 7, line 17)** which comprise lower branched chain dialkyl ethers, aromatics, paraffins, olefin, and cycloparaffins, in which cyclohexane was used as the cycloparaffinic cut **(see col. 4, lines 27-33)**. The reference further discloses the use of up to 20% cycloparaffins in the blends **(see col. 4, line 74 to col. 5, line 19)**.

20. Schoppe et al. and Henderson are analogous as both references are drawn to fuel compositions for spark ignition engines.

21. It would have been obvious to one of ordinary skill in the art at the time of invention to substitute a third base (B3) of cycloparaffins, specifically cyclohexanes, in an amount up to 20%, as taught by Henderson for a portion of the isoparaffinic base (B1) in Schoppe et al. to arrive at a composition within the scope of claim 18. One of ordinary skill in the art would have been motivated to do so as Schoppe et al. disclose that, in the fuel composition of Example 2, there is a significant quantity of methyl t-butyl ether (14%) **(see Schoppe et al., col. 7, Example 2, line 5)** and Henderson teaches

that cycloparaffins may be substituted for a portion of a paraffinic cut **(see col. 4, lines 55 to 60)** and that, while holding the aromatic content of a gasoline composition constant (in the case of Schoppe et al., 15% toluene), adding cycloparaffins increases the effective octane number of dialkyl ethers **(see col. 4, line 74 to col. 5, line 13)**, such as the methyl t-butyl ether in the composition of Example 2 in Schoppe et al.

22. Further, it is considered that in Shoppe et al., as modified above, the ratio R of the quantities by volume (B1+B2)/B3 is greater than 2.0, as the composition of the fuel of modified Schoppe et al. would be considered to contain, at the maximum level of cycloparaffin substitution, 40% isooctane, 15% xylene, 14% methyl t-butyl ether, 8% isopentane, 3% isobutane, and 20% cyclohexane which would correlate to a ratio R of 2.55 **(where B1=40, B2=11, and B3=20, (B1+B2)/B3 = 2.55)**.

23. In regard to claim 19, it is considered that in Shoppe et al., as modified above, the ratio R of the quantities by volume (B1+B2)/B3 is from 2.3 to 19.0, as the composition of the fuel of modified Schoppe et al. would be considered to contain, at the maximum level of cycloparaffin substitution, 40% isooctane, 15% xylene, 14% methyl t-butyl ether, 8% isopentane, 3% isobutane, and 20% cyclohexane which would correlate to a ratio R of 2.55 **(where B1=40, B2=11, and B3=20, (B1+B2)/B3 = 2.55)**.

24. In regard to claims 20-23, it is considered that in Shoppe et al., as modified above, the ratio K of the quantities by volume B1/B2 is greater 2.0 and from 2.3 to 10.6, as the composition of the fuel of modified Schoppe et al. would be considered to contain, at the maximum level of cycloparaffin substitution, 40% isooctane, 15% xylene,

14% methyl t-butyl ether, 8% isopentane, 3% isobutane, and 20% cyclohexane which would correlate to a ratio K of 3.63 **(where B1=40, B2=11, B1/B2 = 3.63)**.

25. In regard to claims 24, 26, and 51, modified Schoppe et al. discloses all claim limitations as set forth above. Further, it would have been obvious to one of ordinary skill in the art that the cycloparaffins in the hydrocarbon base (B3) of modified Schoppe et al. would be greater than 90% cyclohexanes because, as the set forth above, the fuel composition of modified Schoppe et al. would be considered to contain, at the maximum level of cycloparaffin substitution, 40% isooctane, 15% xylene, 14% methyl t-butyl ether, 8% isopentane, 3% isobutane, and **20% cyclohexane**, in which the base oil B3 contains is essentially constituted by cyclohexanes and is, in fact, constituted by 100% cyclohexanes.

26. In regard to claims 27-29 and 33-34, modified Schoppe et al. discloses all claim limitations as set forth above. Further, Schoppe et al. discloses a fuel composition wherein the first isoparaffinic hydrocarbons cut (B1) is essentially constituted by isoparaffins with eight carbon atoms **(see col. 7, Example 2, line 3, where the first isoparaffinic hydrocarbon cut is 100% isooctane)**.

27. In regard to claim 30-32, modified Schoppe et al. discloses all claim limitations as set forth above. Further, it would have been obvious to one of ordinary skill in the art to expect that the fuel composition of modified Schoppe et al. is such that the isoparaffinic hydrocarbons containing eight carbon atoms are isooctanes **(see col. 7, Example 2, line 3, where the first isoparaffinic hydrocarbon cut is 100% isooctane)**..

28. In regard to claim 35-37 and 38-40, modified Schoppe et al. discloses all claim limitations as set forth above. Further, Schoppe et al. discloses a fuel composition wherein the second isoparaffinic hydrocarbons cut (B2) is essentially constituted by isoparaffins with five carbon atoms. **((see col. 7, Example 2, lines 7-8, where the B2 cut is 73% isopentanes)**, wherein the isoparaffins containing five carbon atoms are isopentanes **(as all isoparaffins with 5 carbons atoms are considered to be isopentanes)**, and wherein the level of isopentanes in the isoparaffinic hydrocarbon cut (B2) with five carbon atoms is greater than 85% or 90% by mass **(again, as all isoparaffins with 5 carbons atoms are considered to be isopentanes, it is considered that the level of isopentanes in the cut of isoparaffins with 5 carbons atoms is 100%)**.

29. In regard to claims 43-44, modified Schoppe et al. discloses all claim limitations as set forth above. Further, it would have been obvious to one of ordinary skill in the art to expect that the fuel composition of modified Schoppe et al. is such that its benzene content is less than 0.2% or 0.1% by volume, as the fuel composition of Schopp et al. either modified or alone contains no benzene.

30. In regard to claims 47-48, modified Schoppe et al. discloses all claim limitations as set forth above. Further, Schoppe et al. discloses use of the fuel to feed spark ignition engines of aircraft **(see Abstract, where aircraft can be competition vehicles.)**

31. In regard to claim 50, modified Schoppe et al. discloses all claim limitations as set forth above. Further, it would have been obvious for one of ordinary skill in the art to

expect that the composition of modified Schoppe et al. would contain 10% of the hydrocarbon base (B3) because, as the set forth above, the fuel composition of modified Schoppe et al. would be considered to contain, at the maximum level of cycloparaffin substitution, 40% isooctane, 15% xylene, 14% methyl t-butyl ether, 8% isopentane, 3% isobutane, and **20% cyclohexane**.

**32. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schoppe et al. (6,451,075) in view of Henderson (US 3,224,848), as applied to claim 18, further in view of Warnatz et al. (2001, Springer, 3rd ed., p. 228).**

In regard to claim 41, modified Schoppe et al. discloses all claim limitations as set forth above. Although, Schoppe et al. does not explicitly disclose the fuel where the isoparaffinic hydrocarbon cut containing 5 carbon atoms is replaced by a cut constituted by hydrocarbons containing 4 carbon atoms, it would have been obvious to one of ordinary skill in the art at the time of invention to do so as the octane number of the fuel, is a variable that can be modified **(as evidenced by Warnatz et al., pg. 228, Table 16.1)**, among others, by adjusting the level of isobutane in the fuel, with the octane number of the fuel increasing as the level of isobutane in the fuel increases **(as evidenced by Warnatz et al., pg. 228, Table 16.1)**, the level of isobutane in the fuel would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the level of isobutane in the fuel cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the level of isobutane in the fuel of modified Schoppe et al. to

obtain the desired octane number (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

**33. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schoppe et al. (6,451,075) in view of Henderson (US 3,224,848), as applied to claim 18, and in further view of Hsu et al. (US 6,183,703).**

In regard to claim 49, modified Schoppe et al. discloses all claim limitations as set forth above.

Modified Schoppe et al. does not explicitly disclose that the fuel can be used to feed a fuel treatment unit, such as a reformer, coupled to a fuel cell.

Hsu et al. teaches a fuel cell with a reformer **(see col. 2, lines 55-65)** that uses paraffins as a fuel source in a reformer **(see col. 6, lines 9-15)**

Modified Schoppe et al. and Hsu et al. are analogous as both references are drawn to paraffinic solvents and their methods of use.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the use of a paraffinic fuel in a reformer coupled to a fuel cell with the fuel composition of Schoppe et al. as Schoppe et al. provides a reliable and consistent octane rating and reduces pollution by lead in the fuel as required by Hsu et al. Further, it amounts to nothing more than combining a known fuel composition in a known apparatus to achieve an expected result.

**34. Claims 18-23, 27-48, 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schoppe et al. (6,451,075) in view of Marschner (US 2,407,717).**

In regard to claim 18, Schoppe et al. discloses a fuel for feeding spark ignition engines fitted in aircraft (Abstract):

- having an F4 octane number at least equal to 130 **(see col. 1, Table 1, line 37, where the supercharge rating is the F4 octane number)**
- said fuel containing substantial quantities of a first hydrocarbons base (B1) essentially constituted by isoparaffins comprising 6 to 9 carbon atoms **(col. 6, Example 1, line18, 67.0% isooctane)**
- a second hydrocarbons base (B2) also constituted by isoparaffins comprising 4 or 5 carbon atoms **(see col. 6, Example 1, lines 20-21, 12.0% isopentane, and 3.0% isobutane)**

35. Shoppe et al. does not explicitly disclose the fuel for feeding spark ignition engines fitted in aircraft wherein the composition contains a third base oil (B3) composed of cycloparaffins, comprising 6 to 8 carbon atoms, in a quantity of at least 5%. Further, Schoppe et al. does not explicitly teach that the ratio of the quantities by volume (B1+B2)/B3 is greater than 2.0.

36. Marschner discloses an aviation fuel comprised of isooctane and 20 to 60% 1,1,2-trimethylcyclopropane (a C6 cycloparaffin) **(see col. 4, lines 54-60)**.

37. Schoppe et al. and Marschner are analogous as both references are drawn to compositions for aviation fuels.

38. It would have been obvious to one of ordinary skill in the art at the time of invention to substitute a 20% portion of the 1,1,2-trimethylpropane, as taught by Marschner, for replacement of the 18% portion of aromatic xylene and a portion of the isooctane cut in the fuel composition as disclosed by Schoppe et al. in Example 1. One of ordinary skill in the art would have been motivated to do so as Marschner discloses that as a component in aviation fuels 1,1,2-trimethylpropane it has a high octane number, a high sensitivity (i.e. good rich mixture properties), produces little gum, and is stable to atmospheric oxidation **(see col. 3, line 36 to col. 4, line 5)** and in doing so there would have been a reasonable expectation of operational success. Further, there would have been motivation to combine in that replacing the aromatic xylene portion of the fuel composition in Schoppe et al. would alleviate the negativities associated with aromatic fuels such as the negative environmental impacts and the highly deleterious effect that aromatics may have on equipment due to their solvent tendencies which cause severe swelling of rubber and rubber-like substances.

39. Further, it is considered that in Shoppe et al., as modified above, the ratio R of the quantities by volume (B1+B2)/B3 is greater than 2.0, as the composition of the fuel of modified Schoppe et al. would be considered to contain 65% isooctane, 20% 1,1,2-trimethylpropane, 8% isopentane, 3% isobutane, which would correlate to a ratio R of 4 **(where B1=65, B2=15, and B3=20, (B1+B2)/B3 = 4)**.

40. In regard to claim 19, it is considered that in Shoppe et al., as modified above, the ratio R of the quantities by volume (B1+B2)/B3 is from 2.3 to 19.0, as the composition of the fuel of modified Schoppe et al. would be considered to contain 65%

isooctane, 20% 1,1,2-trimethylpropane, 8% isopentane, 3% isobutane, which would correlate to a ratio R of 4 **(where B1=65, B2=15, and B3=20, (B1+B2)/B3 = 4)**.

41. In regard to claims 20-23, it is considered that in Shoppe et al., as modified above, the ratio K of the quantities by volume B1/B2 is greater 2.0 and from 2.3 to 10.6, as the composition of the fuel of modified Schoppe et al. would be considered to contain 65% isooctane, 20% 1,1,2-trimethylpropane, 8% isopentane, 3% isobutane, which would correlate to a ratio K of 4.333 **(where B1=65, B2=15, B1/B2 = 4.333)**.

42. In regard to claims 27-29 and 33-34, modified Schoppe et al. discloses all claim limitations as set forth above. Further, Schoppe et al. discloses a fuel composition wherein the first isoparaffinic hydrocarbons cut (B1) is essentially constituted by isoparaffins with eight carbon atoms **(see col. 7, Example 2, line 3, where the first isoparaffinic hydrocarbon cut is 100% isooctane)**.

43. In regard to claim 30-32, modified Schoppe et al. discloses all claim limitations as set forth above. Further, it would have been obvious to one of ordinary skill in the art to expect that the fuel composition of modified Schoppe et al. is such that the isoparaffinic hydrocarbons containing eight carbon atoms are isooctanes **(see col. 7, Example 2, line 3, where the first isoparaffinic hydrocarbon cut is 100% isooctane)**..

44. In regard to claim 35-37 and 38-40, modified Schoppe et al. discloses all claim limitations as set forth above. Further, Schoppe et al. discloses a fuel composition wherein the second isoparaffinic hydrocarbons cut (B2) is essentially constituted by isoparaffins with five carbon atoms. **((see col. 7, Example 2, lines 7-8, where the B2 cut is 73% isopentanes)**, wherein the isoparaffins containing five carbon atoms are

isopentanes **(as all isoparaffins with 5 carbons atoms are considered to be isopentanes)**, and wherein the level of isopentanes in the isoparaffinic hydrocarbon cut (B2) with five carbon atoms is greater than 85% or 90% by mass **(again, as all isoparaffins with 5 carbons atoms are considered to be isopentanes, it is considered that the level of isopentanes in the cut of isoparaffins with 5 carbons atoms is 100%)**.

45. In regard to claims 42 and 52, modified Schoppe et al. discloses all claim limitations as set forth above. Further, it is considered that it would have been obvious to one of ordinary skill in the art that the composition of modified Schoppe et al. contains less than 10% and less than 5% aromatic compounds as there are considered to be no aromatic compounds in the composition of modified Schoppe et al. as the composition of modified Schoppe et al. is considered to contain 65% isooctane, 20% 1,1,2-trimethylpropane, 8% isopentane, 3% isobutene, and therefore no aromatics.

46. In regard to claims 43-46, modified Schoppe et al. Discloses all claim limitations as set forth above. Further, it would have been obvious to one of ordinary skill in the art to expect that the fuel composition of modified Schoppe et al. is such that its benzene content is less than 0.2% or 0.1% by volume, as the fuel composition of Schopp et al. either modified or alone contains no benzene.

47. In regard to claims 47-48, modified Schoppe et al. discloses all claim limitations as set forth above. Further, Schoppe et al. discloses use of the fuel to feed spark ignition engines of aircraft **(see Abstract, where aircraft can be competition vehicles.)**

**48. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schoppe et al. (6,451,075) in view of Marschner (US 2,407,717), as applied to claim 18, further in view of Warnatz et al. (2001, Springer, 3rd ed., p. 228).**

In regard to claim 41, modified Schoppe et al. discloses all claim limitations as set forth above. Although, Schoppe et al. does not explicitly disclose the fuel where the isoparaffinic hydrocarbon cut containing 5 carbon atoms is replaced by a cut constituted by hydrocarbons containing 4 carbon atoms, it would have been obvious to one of ordinary skill in the art at the time of invention to do so as the octane number of the fuel, is a variable that can be modified **(as evidenced by Warnatz et al., pg. 228, Table 16.1)**, among others, by adjusting the level of isobutane in the fuel, with the octane number of the fuel increasing as the level of isobutane in the fuel increases **(as evidenced by Warnatz et al., pg. 228, Table 16.1)**, the level of isobutane in the fuel would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the level of isobutane in the fuel cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the level of isobutane in the fuel of modified Schoppe et al. to obtain the desired octane number (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

**49. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schoppe et al. (6,451,075) in view of Marschner (US 2,407,717) and Ethyl Corporation (Aviation Fuels and their effects on Engine Performance, 1951) as applied to claim 18, and in further view of Hsu et al. (US 6,183,703).**

In regard to claim 49, modified Schoppe et al. discloses all claim limitations as set forth above.

Modified Schoppe et al. does not explicitly disclose that the fuel can be used to feed a fuel treatment unit, such as a reformer, coupled to a fuel cell.

Hsu et al. teaches a fuel cell with a reformer **(see col. 2, lines 55-65)** that uses paraffins as a fuel source in a reformer **(see col. 6, lines 9-15)**

Modified Schoppe et al. and Hsu et al. are analogous as both references are drawn to paraffinic solvents and their methods of use.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the use of a paraffinic fuel in a reformer coupled to a fuel cell with the fuel composition of Schoppe et al. as Schoppe et al. provides a reliable and consistent octane rating and reduces pollutiong by lead in the fuel as required by Hsu et al. Further, it amounts to nothing more than combining a known fuel composition in a known apparatus to achieve an expected result.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JERROD B. MARTEN whose telephone number is

(571)270-7066. The examiner can normally be reached on Mon.-Thurs., 7:30 a.m.-5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571)272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/J. B. M./
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